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Coastal Science and Research News from Across the USGS

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Fieldwork

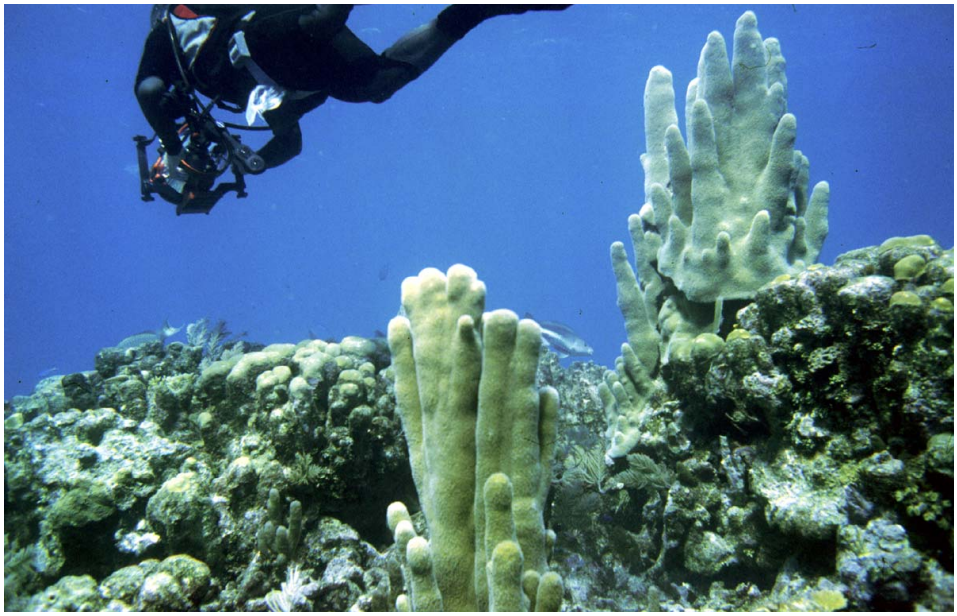
USAID/USGS/Honduras Hurricane Mitch Program: Coral Reef Health in the Bay Islands of Honduras

By Chris Reich and Don Hickey

Our fifth and probably final visit to the Bay Islands of Honduras occurred from November 9 to 21. **Don Hickey** and **Chris Reich** spent 12 days visiting three of the four Bay Islands (Roatán, Cayos Cochinos, and Guanaja). The final site visit was scheduled because the USAID/USGS Hurricane Mitch Program came to a close on December 31. The program was created to provide information in support of hazard mitigation and reconstruction after Hurricane Mitch—a Category 5 hurricane and one of the most destructive ever recorded in the Western Hemisphere—struck Central America in 1998. Our part of the program focuses on coral-reef health in the Bay Islands. The results from all projects in the program will be placed on a clearinghouse Web site maintained by the EROS data center (Sioux Falls, SD). The Web site contains information on projects that range from landslide hazards and mapping (LIDAR surveys), stream gauging, and flood-hazard mapping to impacts on such coastal environments as mangroves, seagrasses, and coral reefs (see URL **http://mitchnts1.cr.usgs.gov/index.html)**.

Cayos Cochinos, which is located on the continental shelf approximately 9 miles (14.5 km) off the north coast of Honduras, is not a popular destination for tourists. Roatán and Guanaja, which are surrounded by deep water about 35 mi (56 km) north of Honduras, are popular with international tourists interested in scuba diving. The coral reefs around Cayos Cochinos are heavily impacted by what is taking place on the mainland. Runoff carries freshwater, sediment, pollution, and contamination to this region. Mainland runoff is generally not a problem for Roatán and Guanaja.

Honduras received its share of hurricane activity during the 2001 season, though nothing to compare with Hurricane Mitch. Hurricane Irís (early October) skirted the northern fringes of the Bay Islands, producing some rain and moderate winds out of the north but otherwise causing no widespread damage. Hurricane Michelle (late October), however, dropped copious amounts of rainfall on the mainland and throughout the Bay Islands. It also caused extensive land erosion to the sand islands around Cayos Cochinos and may have caused some physical damage (breakage) to branching corals, as was documented at our sites. Mainland river discharge carried garbage, large tree stumps, and logs out to the islands. Rainfall during both hurricanes was recorded at our two sites (Roatán and Cayos Cochinos), where the recording instruments are housed in 5 m of water (see graph, next page). Salinity, temperature, and photosynthetically active radiation (PAR) are recorded at 10-minute intervals. It is apparent from the data that this region is well into its rainy season and that there is sufficient oceanic mixing to get freshwater spikes at 5-m water depths out on the reef crest.



***Don Hickey** shooting video footage of a healthy reef in Roatán Marine Reserve, Honduras.*

Other accomplishments and observations:

- Water quality (that is, visibility) was poor at all three sites (Roatán, Cayos Cochinos, and Guanaja), most likely as a result of all the rain they have been receiving.
- Corals throughout the Bay Islands were infected with black-band disease in 1999, but since then very little black-band disease has been observed.
- Coral reefs at Roatán (see photograph, above) appear to be the healthiest (low occurrence of diseases, moderate algal cover, higher percentage of coral cover, and highest biodiversity).

(Coral Reef Health continued on page 2)

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Submission Guidelines

Deadline: The deadline for news items and publication lists for the February issue of *Sound Waves* is Tuesday, January 22.
Publications: When new publications or products are released, please notify the editor with a full reference and a bulleted summary or description.
Images: Please submit all images at publication size (column, 2-column, or page width). Resolution of 200 to 300 dpi (dots per inch) is best. Adobe Illustrator© files or EPS files work well with vector files (such as graphs or diagrams). TIFF and JPEG files work well with raster files (photographs or rasterized vector files).

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Want to e-mail your question to the USGS? Send it to this address: ask@usgs.gov

Fieldwork, continued

(Coral Reef Health continued from page 1)

• Encrusting sponges and tunicates were still present at all sites.

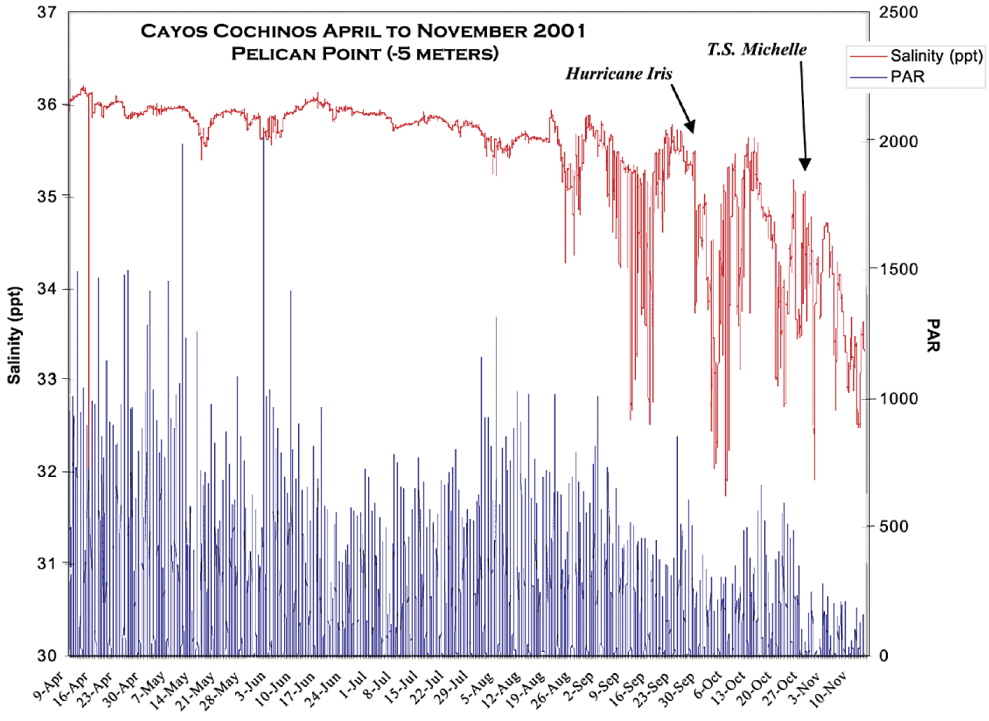
• Bleaching events are observed periodically, but they have not decimated these reefs as in other regions around the Caribbean.

• Overfishing has historically been a problem for the Bay Islands, but now both Cayos Cochinos and Roatán have designated marine reserves that prohibit most fishing.

• Underwater still photography and digital video recordings were utilized in documenting the status of the coral-reef ecosystem at a particular period of time. Time-series archives of specific reefs will assist us in documenting the decline or improvement of those reefs affected by anthropogenic stresses and (or) natural environmental perturbations.

On the last full day of our field trip, we were invited to a local school on Guanaja to explain to the students what it was we were doing and why (see photograph). The students, ages 6 to 12, listened patiently to explanations of how corals grow, the differences between healthy and failing reefs, the biodiversity associated with coral reefs, and the impacts and recovery process due to such extreme weather conditions as hurricanes. During the PowerPoint presentation, the students also had an opportunity to view an underwater video of the local coral-reef environment recorded earlier in the week. Finally, the students were allowed to ask questions. It is amazing sometimes what the curious minds of children ponder.❁

Impromptu discussion with Lighthouse Christian Academy school children on the island of Guanaja, Honduras. ***Don Hickey*** *explains to the children why we study reefs, why they are important, and what happened to the reefs during Hurricane Mitch, while they take turns watching video footage shot earlier in the trip.*



Salinity data (upper data set, red) and photosynthetically active radiation (PAR) data (lower data set, blue) at Pelican Point in Cayos Cochinos, Honduras, showing onset of rainy season punctuated by Hurricanes Irís and Michelle (a tropical storm while over Honduras). Instrument is located in a water depth of 5 m. PAR decreases with higher influx of freshwater, which is linked to cloud cover and degradation in water quality. There was also some growth on the PAR sensor that led to a slow decline in the PAR value.